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AIR SAMPLING PLAN FOR  
RICHARDSON FLAT TAILINGS  
PARK CITY, UTAH

TDD R8-8605-12  
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AIR SAMPLING PLAN FOR  
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TDD #R8-8605-12

I. INTRODUCTION AND OBJECTIVES

Under the provisions of Technical Directive Document (TDD) R8-8605-12, Region VIII, U.S. Environmental Protection Agency (EPA) tasked Ecology and Environment, Inc. Field Investigation Team (E&E FIT) to prepare an air sampling plan for Richardson Flat Tailings, Park City, Utah (Figure 1).

This sample plan has been prepared to satisfy in part the requirements of the above referenced TDD and is designed to insure the objectives of the field investigation are met in a cost effective, timely and safe manner. This sample plan conforms to the requirements established in the Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II - Ambient Air Specific Methods; EPA - 600/4-77-027A, May, 1977; U.S. EPA, Research Triangle Park, N.C., 40 CFR Part 58, July, 1983, and the Region VIII FIT SOP for High Vol Air Sampling at Hazardous Waste Sites, prepared under TDD #R8-8408-02.

The overall scope of this project involves the set-up and operation of six high-volume air samplers at five pre-determined locations around the study area and collection of thirty samples for heavy metals and five samples for respirable particulate analysis over approximately a one week period. A summary of sample location, rationale and parameters to be measured is located in Table 1.

The objective of this investigation is to determine if air route migration of heavy metal contaminated suspended particulate matter exists, and to document such a release using quantitative air sampling techniques.



TABLE 1  
SAMPLE TYPES, PARAMETERS, LOCATIONS AND RATIONALES

<u>Sampler Number</u>	<u>Location</u>	<u>Rationale</u>	<u>Parameters</u>
RF-AM-01	0.5 miles south of site.	Distant background sample.	Arsenic, Cadmium, Lead & Zinc
RF-AM-02	East side of tailings area.	Document airborne contaminants blown to the east of the tailings.	Arsenic, Cadmium, Lead & Zinc
RF-AM-03	Same as RF-AM-02.	A duplicate of RF-AM-02 for quality control purposes.	Arsenic, Cadmium, Lead & Zinc
RF-AM-04	Northwest side of tailings area and southwest of the dam.	Document airborne contaminants blown to the northwest of the tailings.	Arsenic, Cadmium, Lead & Zinc
RF-AM-05	Same as RF-AM-04.	Document the respirable portion of the particulate fraction blown off-site from the tailings.	Arsenic, Cadmium, Lead & Zinc
RF-AM-06	Southwest side of tailings area.	Document airborne contaminants blown to the southwest of the tailings.	Arsenic, Cadmium, Lead & Zinc
Met	Between railroad tracks and south border of tailings.	Collect meteorological data during sampling activities.	Wind direction, wind speed, relative humidity and barometric pressure

## II. SITE DESCRIPTION

Richardson Flat Tailings is located in Summit County, Utah approximately 3.5 miles northeast of Park City. The tailings cover approximately 160 acres in the NW 1/4, Section 1, Township 2 South, Range 4 East (Figure 1). Highway 40 runs east and north of the area, and a Union Pacific Railroad track bisects the southern portion of the tailings. Silver Creek is located approximately 500 feet from the northwestern most extension of the tailings. An intermittent stream (water diversion ditch) forms the southeastern border of the tailings. An ephemeral pond overlies the northeastern portion of the tailings, and is contained by a dam at the northwestern end.

## III. SITE HISTORY

The mill tailings at Richardson Flat came from the Keetley Ontario Mine and other metal mines currently owned by United Park City Mines (UPCM). The most recent use of the area for tailings disposal was during the period of time from 1975 to 1981. During this time, UPCM had all its mining properties leased to either Park City Ventures or Noranda Mining, Inc. who constructed and operated milling facilities on UPCM property.

It is estimated that at least seven million tons of tailings were deposited on Richardson Flat. While there is no current dumping of tailings on site, Mr. Ray Wortley is leasing the tailings from UPCM to use for sewer line and road base backfill.

The site is not secured in any way from public access. An unpaved road along the southern boundary of the tailings is unrestricted. Cattle and sheep are grazed in the area, and cattle have been observed walking across the tailings.

#### IV. METEOROLOGY

The data presented in the following section was acquired from The Climatic Atlas of the United States, U.S. Department of Commerce, Environmental Sciences Services-Administration, Environmental Data Service, June 1968. The climate of the Park City area is characterized by moderate fluctuations in temperature and precipitation throughout the year. Mean monthly temperatures range from 10 degrees Fahrenheit (°F) in December, January, and February to 80°F in June, July and August. During the month of July (for which this sampling trip is scheduled) the average temperature is approximately 60°F. Precipitation for the Park City area varies from a mean monthly amount of 1.00 inches in July to 2.22 inches in December. Prevailing wind direction at Park City is typically from a southeasterly direction throughout the year. The meteorological station will be operated at the site for two days prior to initiating sample collection. The data collected will be used to determine the primary wind direction at the site and to establish temperature and barometric pressure for calibration. Relative humidity for the Park City area varies from 40 percent in August to 80 percent in December and February. The average relative humidity in July is 50 percent. Barometric pressure ranges from 1022 millibars (30.18 inches of mercury) in December and January to approximately 1010 millibars (29.83 inches of mercury) in June.

On June 20, 1985, clouds of fugitive dust were photographed moving offsite as a result of strong winds from the west-northwest. In May, 1985, FIT observed the wind direction to be from the southwest. Results of analyses of surface tailings samples showed concentrations as high as 3,600 ppm arsenic, 80 ppm cadmium, 8,530 ppm lead, and 6,360 ppm zinc. Mean soil concentrations for those metals in the western U.S. respectively are 5.5 ppm, 0.2 ppm, 17 ppm, and 55 ppm.

The Richardson Flat tailings lie in a small flat topographic basin of approximately 800 acres which is drained by Silver Creek. The configuration of the basin is likely to have a pronounced effect on local air flow. The basin is situated at 6600 feet elevation and



is surrounded by ridges of the Wasatch Mountains that range from 6700 feet to 7600 feet. Silver Creek enters the basin from the west-southwest then angles to the north, hence an upvalley air flow would likely traverse the site and continue northward. This is consistent with the May, 1985 observation of wind-direction.

## V. FIELD PROCEDURES

### A. CONCEPT OF OPERATIONS

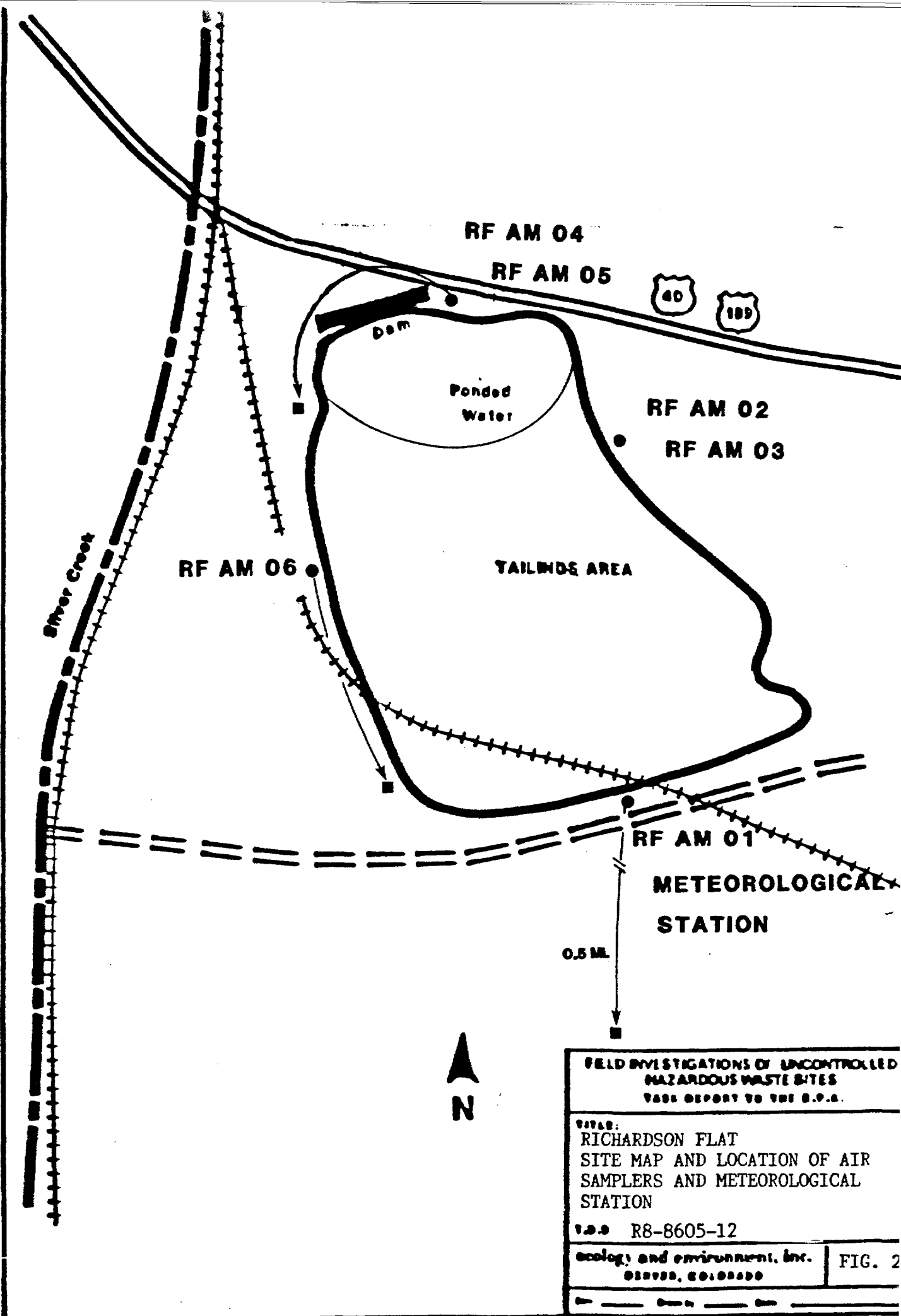
The sampling program is scheduled to begin on or about July 7, 1986 and continue until July 14. The Field Investigation Team will consist of the following E&E personnel:

Henry Schmelzer - Project Officer/Air Sampling Specialist  
Dave Franzen - Site Safety Officer/Air Sampling Specialist

### B. SAMPLING LOCATIONS

All high-volume air sampling units will be set up in strategic locations adjacent to the study area (Figure 2). Four sampling locations will be used and include one respirable particulate and one duplicate sample location for quality assurance purposes. All proposed sampling sites will be located twenty to thirty feet or greater from the tailings in accordance with siting criteria established in 40 CFR Part 58, Appendix E.

Sample location RF-AM-01 will be located approximately 0.5 miles south of the tailings area and will serve as a distant background sample. Prevailing winds historically blow from the southeast. Sampler location RF-AM-02 will be located on the east side of the tailings area. Sampler RF-AM-03, which is a quality control duplicate, will also be located here. Sampler RF-AM-04 will be located on the northwest side of the tailings area, southeast of the dam. Sampler RF-AM-05 with the PM-10 respirable head will also be located here. Sampler RF-AM-06 will be located on the southwest side of the tailings area.



As specified by the FIT SOP V-1, sampler inlets will be elevated to two meters above ground surface in the breathing zone. Electrical power is not available at the site, consequently, portable unleaded gasoline-powered generators will be used to supply power at each of the four sampling sites. The generators will be located approximately fifty feet upwind from each sampler.

The meteorological station will be located on the south side of the tailings area by the railroad tracks and between the tailings and the gravel road. Barometric pressure, temperature, wind speed and direction will be recorded by the meteorological station. Wind direction data will be used to determine which of the three samplers located adjacent to the site are upwind and downwind of the site. During each twelve hour sampling period temperature and barometric pressure are required to convert flow-rate to conditions at STP.

The meteorological data will be representative of conditions on site during the period of sampling. Radical changes in wind direction data will be taken into account when designating the appropriate upwind sampler location. Precipitation measurements are not needed for data calculations, however, samples will not be collected during extended periods of precipitation (i.e. 24 hours). Tailings dust is expected to blow from the site over a five day period even when precipitation occurs occasionally. Frequency and duration of precipitation, and changes in meteorological conditions will be noted in the field logbook.

No railroad-associated contaminants are expected, however, any dust produced by train passage will be noted in the field logbook. The frequency of train passage will also be noted.

The potential for roadway lead contaminants from Highway 40 will be accounted for by taking three soil samples perpendicular to the highway at 0.25 to 0.5 miles from the site.

The potential for dust contamination from the gravel road which parallels the southern boundary of the site will be solved by locating RFAM-1 0.5 miles south of the site as a distant background sampler. Frequency of vehicle passage on the road will be noted.

Based on information obtained during past site visits, no obstructions by vegetation are anticipated. The tailings material supports little to no vegetation and the surrounding area is predominated by semi-desert shrubs and forbs. As specified in 40 CFR, Part 58, Appendix E and SOP IV-1 samplers will be located at least twenty meters from any trees or other obstructions which might be present.

#### C. COORDINATION

Coordination for site access will be maintained with UPCM, Susan Kennedy of E&E, Inc. and Kelcey Land of the Region VIII EPA Superfund group.

#### D. FIELD SAFETY

An approved Site Safety Plan for this project will be developed prior to the execution of the sampling plan.

#### E. PROJECT SCHEDULE

The tentative project dates are as follows:

July 7	-- Travel to Salt Lake City, Utah
July 8	-- Set up sampling locations at Richardson Flat
July 9-13	-- Sample
July 14	-- End sampling, take down samplers

## F. CONTROL OF CONTAMINATED MATERIALS

Air sampling activities will take place off-site, and such sampling is not expected to generate any contaminated materials.

## VI. LOGISTICS

All safety and operational equipment necessary to conduct this investigation is currently available by FIT VIII. One inhalable particulate (<10 microns) sampler head will be used in this project. All equipment will be transported in a FIT vehicle. Samples will be delivered to EPA Region VIII Laboratory or an approved CLP lab for analysis. If a CLP laboratory is used, FIT will provide a Special Analytical Services request stating the method, detection limits and quality assurance criteria.

## VII. QUALITY CONTROL

### A. SAMPLE METHODS

Prior to sampling, all equipment will be thoroughly inspected to insure it is functioning properly. Each high volume unit will be calibrated, and flow will be set using an orifice calibration unit in the field. Barometric pressure, temperature, wind speed and direction will be recorded by the meteorological station.

Samples will be collected for twelve hours (8-9 a.m. to 8-9 p.m.) for five consecutive days, weather permitting. The samples will be collected on cellulose filters. Stainless steel filter cartridges with covers will be used to handle filters and facilitate changing.

Samples will be analyzed for arsenic, cadmium, lead and zinc content. A detection limit of 1.0 part per billion (ppb) will be used by the laboratory when analyzing for the above constituents.

TABLE 2

## SAMPLE PLAN CHECK LIST

Site Name: Richardson Flat Tailings

REGION VIII

YOD Number: R8-8605-12Address: Highway 40, Keetley JunctionProject Team Leader: Henry SchmelzerCity: Park City County: SummitSampling Date: July 7 to 11, 1986

Sample Location	Sample Type	Field Parameters					Laboratory Parameters														
		Temp	pH	Cond	DO	Special	Task 1 & 2 * Metals	Task 3 Cyanide	Task 3 Sulfide	Task 3 Ammonia	Special Anions	Special NO3&NO2	Special Inorganic	VOC	B/X/A Extract	Pesticide	Special Organic	Spill	Dup	Spike	Blank
RF-AM-01	Air						X														Background
RF-AM-02	Air						X														
RF-AM-03	Air						X												X		
RF-AM-04	Air						X														
RF-AM-05	Air						X														Respirable
RF-AM-06	Air						X														
Samples will be collected at each location for 5 days.																					

\* Arsenic, cadmium, lead and zinc only.

The hi-vol units will be positioned two meters off the ground at the chosen sampling locations. Each unit will be operated at a pre-set flow rate (40 cubic feet per minute) for twelve hours. The filter will then be removed as quickly as possible, folded lengthwise so that only surfaces with collected particulates are in contact, and catalogued in a manila folder. All necessary data will be fully documented. The folders will be placed in envelopes and submitted for chemical analysis. The samples will be analyzed by ICP scan.

Only one PM10 respirable head sampler is available to FIT in Region VIII. The PM10 sample will aid in evaluating overall health effects. Due to the fact that sample weight will not be collected, the metal concentration in the PM10 fraction and the total particulate fraction cannot be compared with one another.

Quality control of documentation, filter handling and submission, chain of custody, calibration and unit maintenance will be in accordance with the previously cited FIT SOP and quality assurance will be strictly maintained.

The field blanks, one for each sampling day, and two blank filters designated "laboratory spike" will be included as part of the laboratory QA/QC procedure. All filters will be from one lot number.

All applicable quality assurance requirements for Prevention of Significant Deterioration (PSD) Air Monitoring as defined in 40 CFR Part 58, Appendix B, and Section No. 2.2.8. of the "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume II - Ambient Air Specific Methods," will be implemented for this program.

#### B. CHAIN OF CUSTODY

Chain of custody procedures as prescribed by the NEIC will be strictly adhered to throughout the sampling program.

#### VIII. SAMPLING REPORT

Upon completion of the sampling program, a report of sampling activities will be submitted to the EPA Region VIII. Upon receipt of the analytical data, an Analytical Results Report will be prepared under a separate TDD.